

Mobility Technologies

Future Combat Systems Technology Conference

27-29 June 2000

MR. JERRY CHAPIN

***Director, Tank Automotive Research
and Development Engineering Center***

(810)-574-6144/45309

e-mail: ChapinJ@tacom.army.mil

AMC -- Your Readiness Command...Serving Soldiers Proudly



The Army Transformation

**Legacy
Force**

Sustain & Recapitalize

**Objective
Force**

S&T

R&D and Procurement

**Interim
Force**

Initial BCT

Interim

Transform

Transform

**O
B
J
E
C
T
I
V
E**

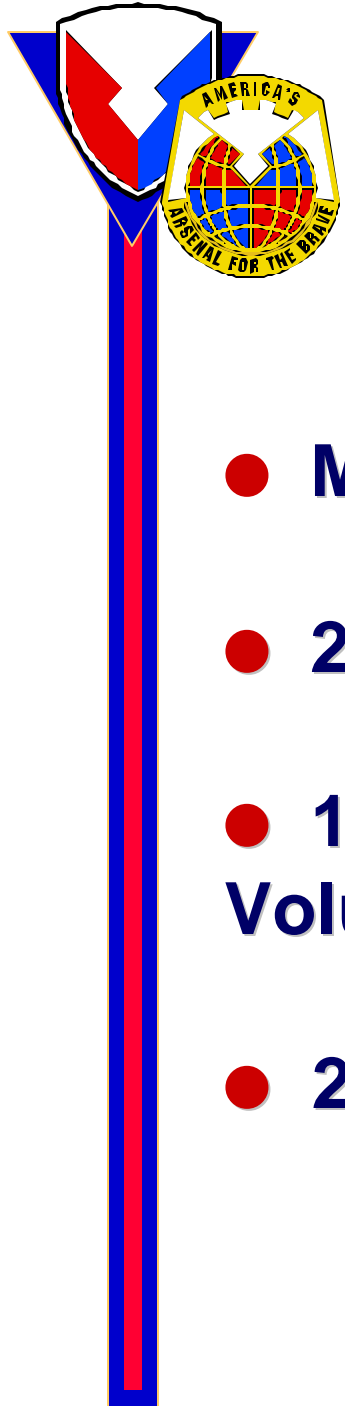
2000

First
Interim
BCT 2003

First Unit
Equipped
Objective

*... Responsive, Deployable, Agile, Versatile,
Lethal, Survivable, Sustainable.*





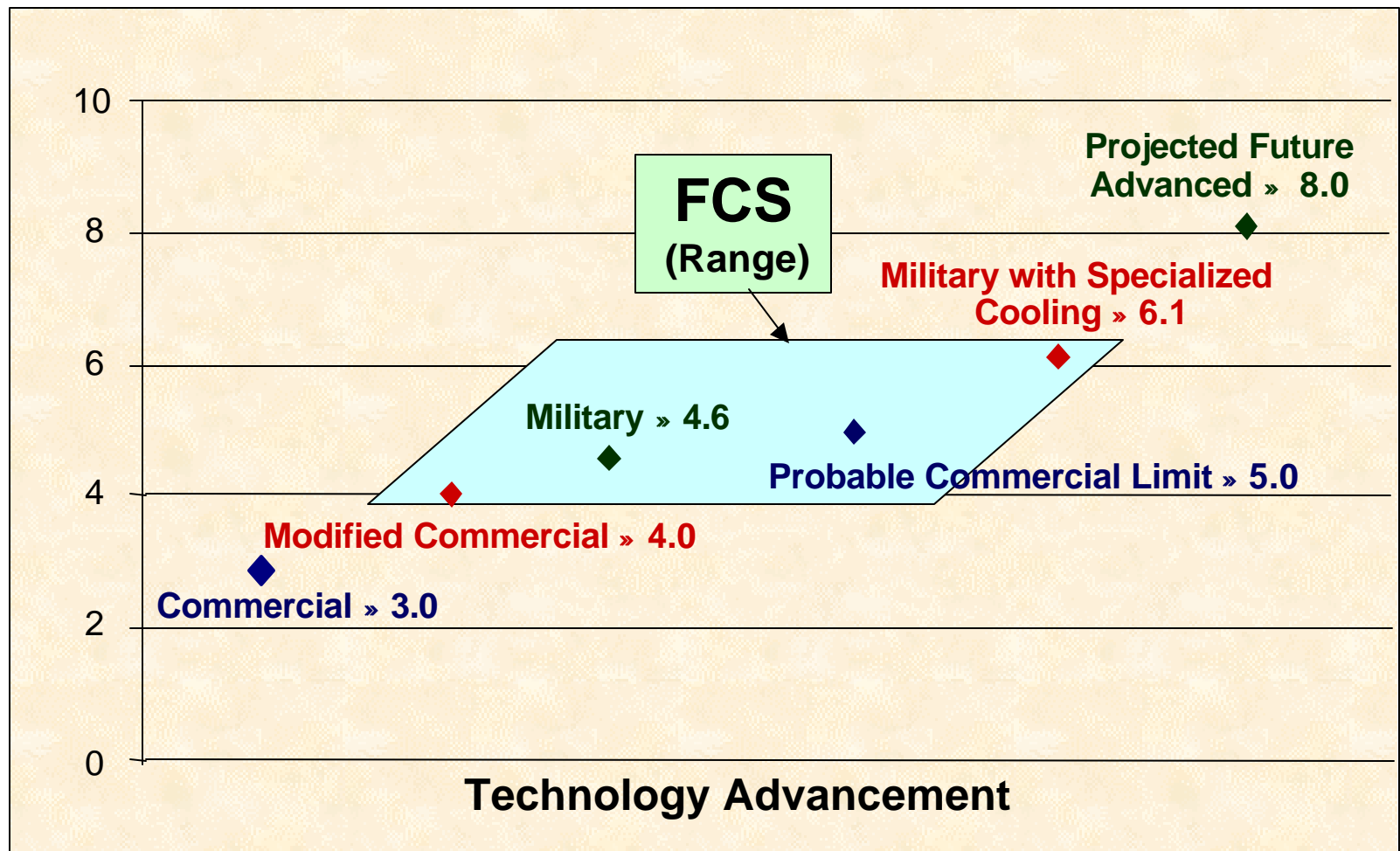
Mobility Significantly Impacts Vehicle

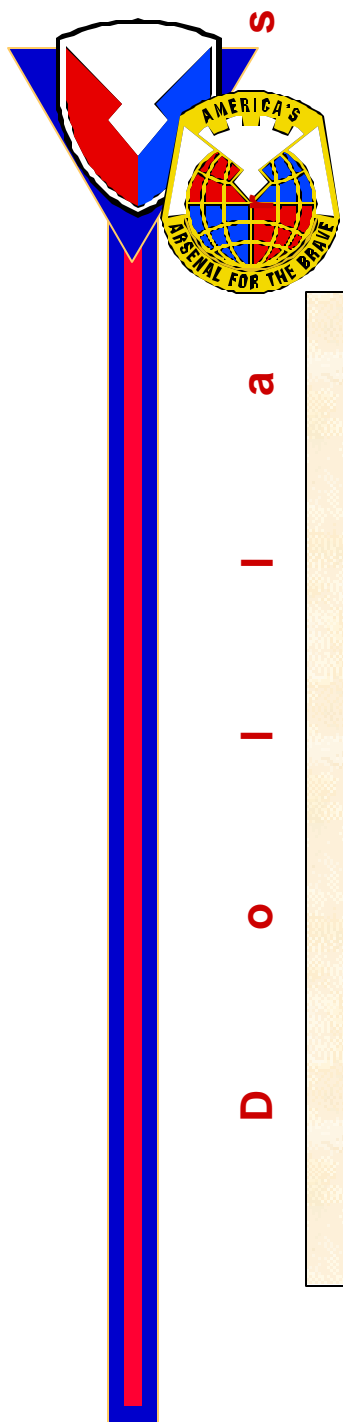
- **Major Impact on Vehicle Survivability**
- **26-59% Cost of Ownership**
- **19-46% of Combat Vehicle Under-Armor Volume**
- **29-42% of Vehicle GVW**

Installed Power Density of Alternative Diesel Engine Technologies

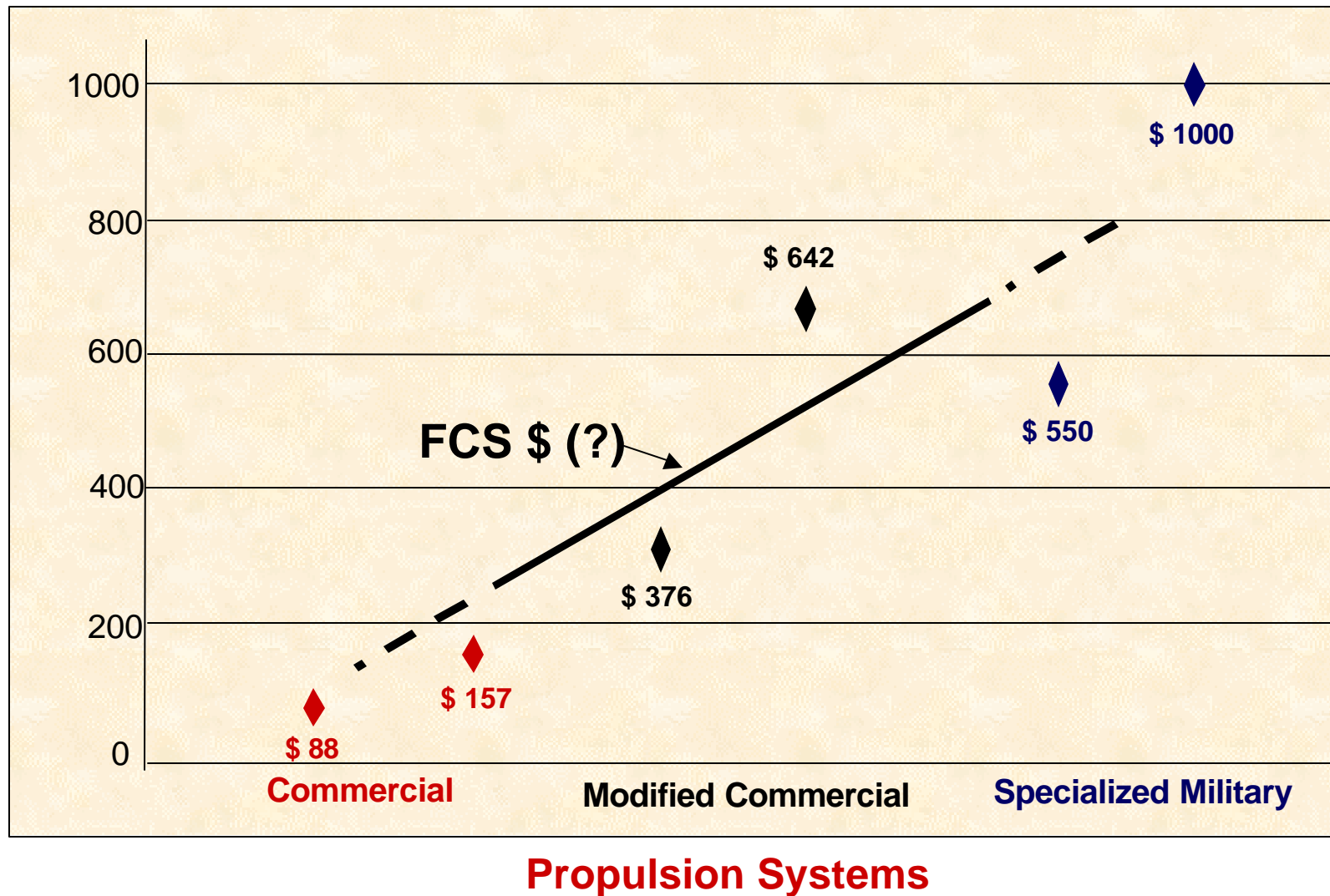
Total System Sprocket hp/ft³ Potential

r
3
p
s



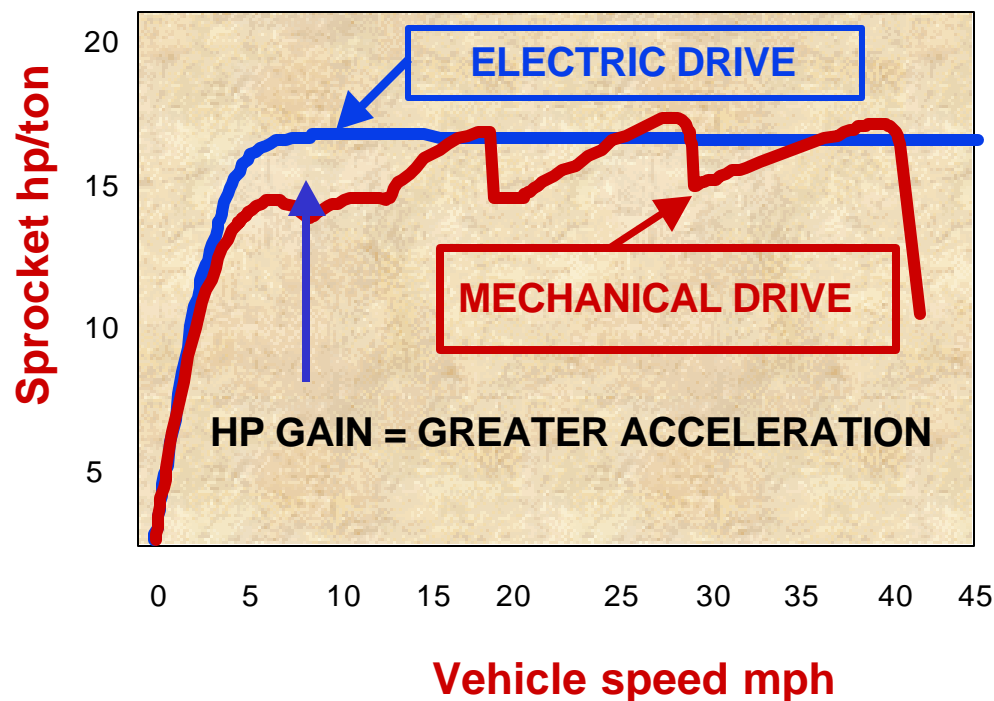
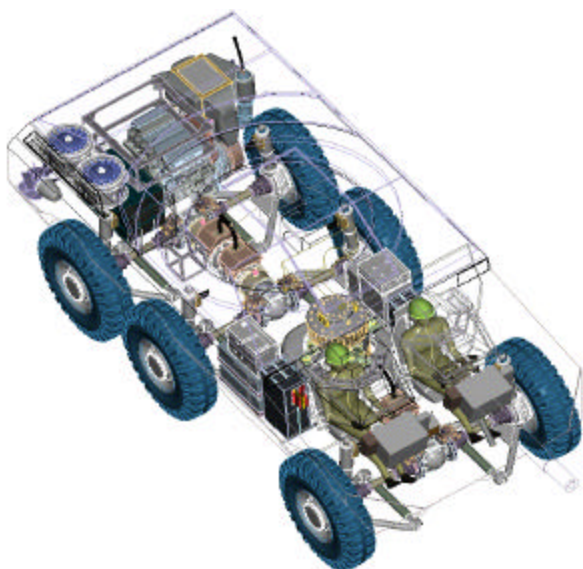


Propulsion System Costs and Sprocket Horsepower

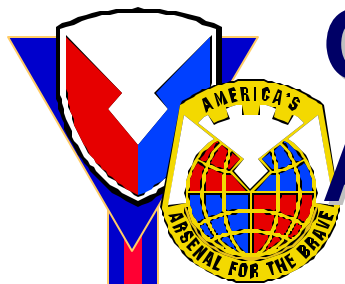




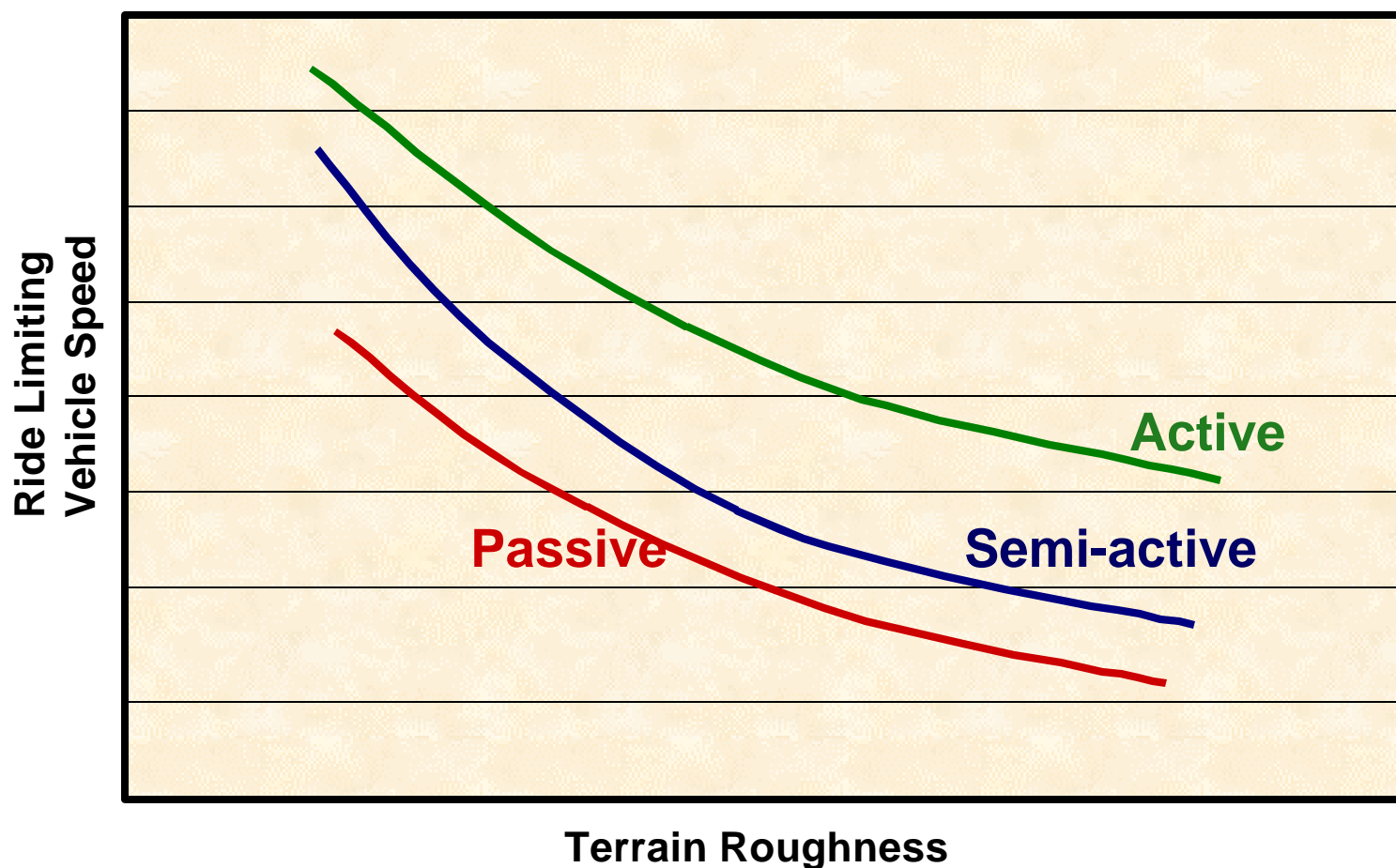
Hybrid Electric Drive Provides Superior Automotive Performance



Peak Torque at Zero Speed from Electric Traction Motor Provides Greater Acceleration and Better Efficiency



Off-road Speed Improvement with Active & Semi-active Suspensions



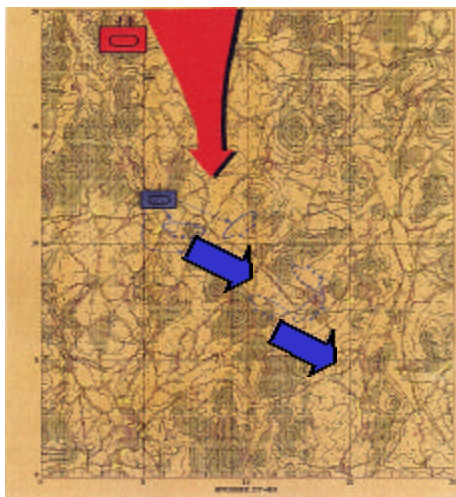


Mobility Effects on Survivability

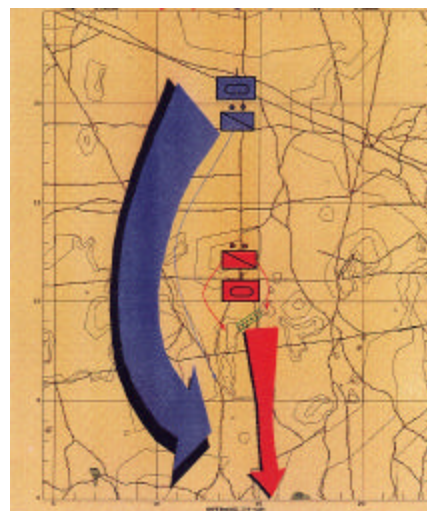
Used CASTFOREM to evaluate operational benefits of increased mobility

Parametrically varied maximum cross country speed

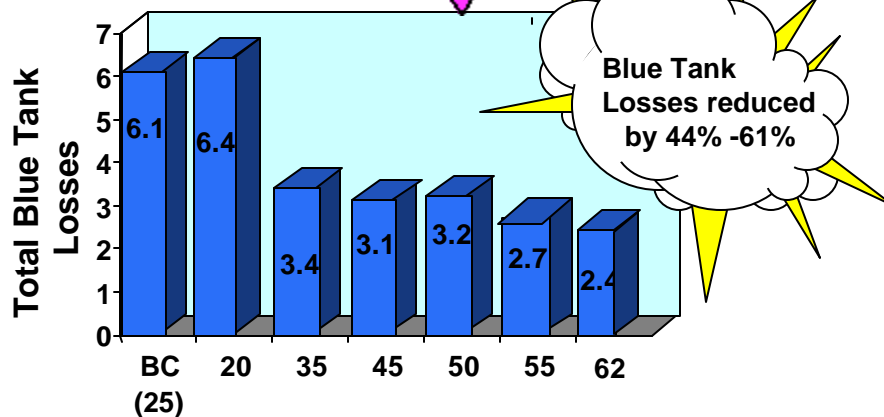
Used 2 company sized scenario vignettes developed by TRAC-WSMR & Ft. Knox



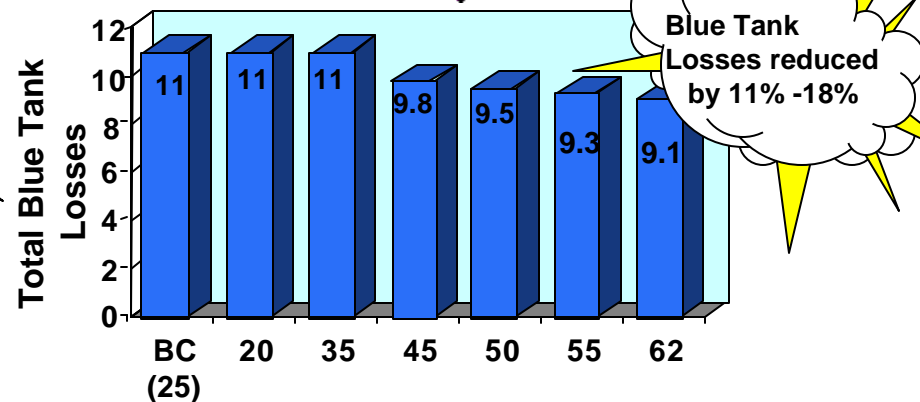
- Rolling Terrain
- Defensive Vignette
- Company Defense vs. Threat Tank BN
- Defend in Sector
- 14 M1A2
30 T72S
- Visibility 2-3 km



- Desert Terrain
- Offensive Vignette
- Company Offense attacking Threat FSE
- Blue Pursuit
- 11 M1A2
30 T72S
8 BMP-2
- Visibility 10 km



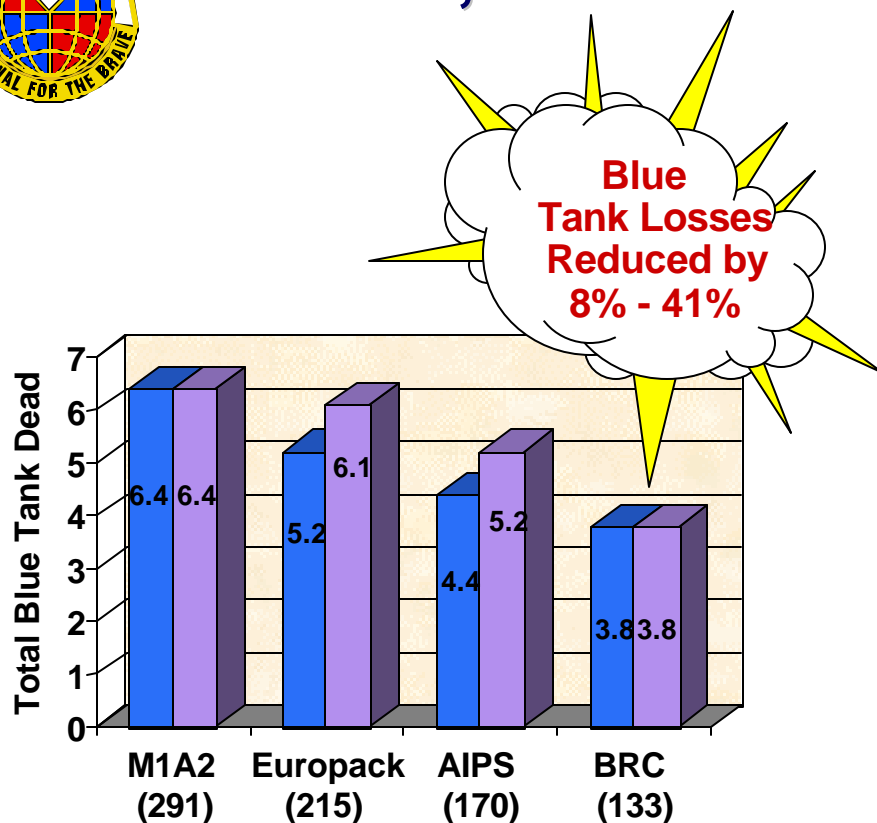
Maximum Speed Over Good Cross Country (MPH)



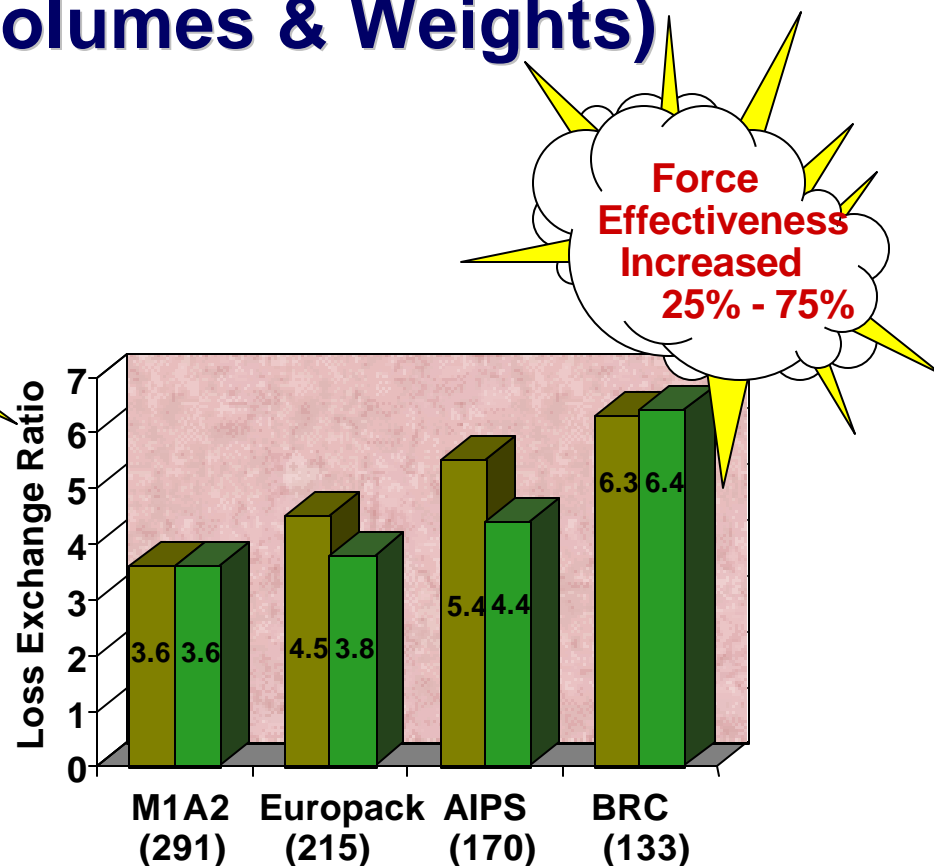
Maximum Speed Over Good Cross Country (MPH)



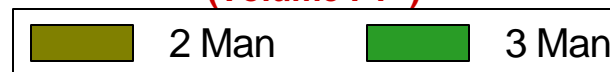
Defensive Vignette (Rolling Terrain) Propulsion Alternatives (Constant Sprocket Power, Different Volumes & Weights)



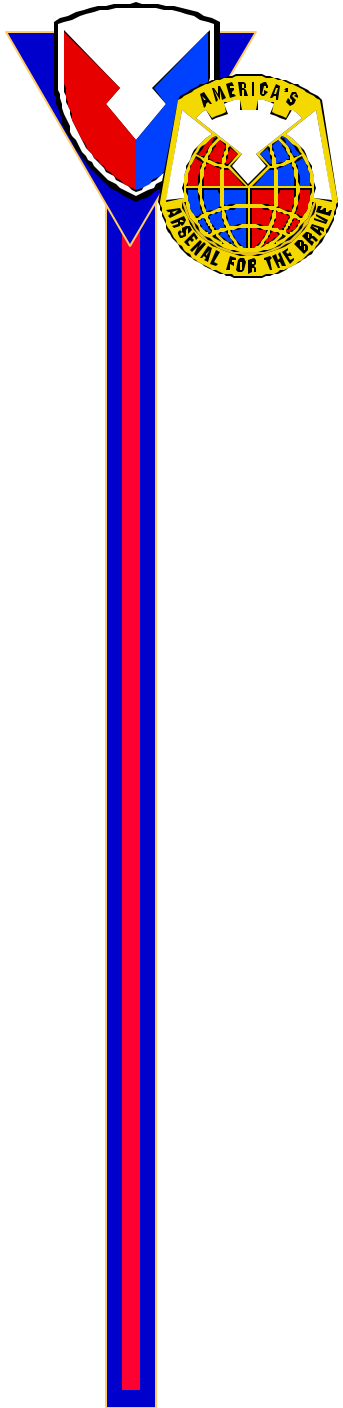
FCS Propulsion Alternatives
(Volume FT^3)



FCS Propulsion Alternatives
(Volume FT^3)



- Increased propulsion technology allowed the Blue Tanks to distance themselves quickly from Threat forces and reposition themselves into protected positions from which to engage the enemy. The additional height to the vehicle from the 3 man crew over the 2 man crew alternatives had an impact to Blue survivability and lethality as the Threat force was able to detect them earlier.



Summary

Mobility Drives...

- **Cost of Ownership**
- **Under-Armor Volume**
- **Gross Vehicle Weight**
- **Vehicle Survivability**